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Contact:
Anne Watzman
412-268-3830

Byron Spice
412-268-9068

For immediate release:
August 30, 2006

Carnegie Mellon Scientists To Be Honored by R&D Magazine For Developing Robot That Explores Live Underground Gas Mains

PITTSBURGH—Principal Systems Scientist Hagen Schempf and his team at the National Robotics Engineering Center (NREC) in Carnegie Mellon University's Robotics Institute are among 100 inventors this year who will receive R&D Magazine's prestigious "100 Award" for outstanding innovation.

Principal Systems Scientist Hagen Schempf and his team at the National Robotics Engineering Center are among 100 inventors who will receive R&D Magazine's "100 Award" for outstanding innovation this year.

Schempf and his team are being recognized for designing, building and deploying Explorer™, the first remote-controlled, untethered, wireless, crawling robot that inspects underground natural gas distribution pipelines. Explorer can inspect hundreds to thousands of feet of pipe from one excavation point, which can significantly reduce costs per foot of pipe inspected. Other camera systems currently require new excavations every 100 to 200 feet.

Explorer is featured in the September issue of R&D, along with the other winning innovations. Schempf and his team will also be honored at R&D's 44th annual black-tie awards banquet Oct. 19 at the Navy Pier in Chicago. According to the magazine, "the winning of an R&D 100 Award provides a mark of excellence known to industry, government and academia as proof that the product is one of the most innovative ideas of the year."

Schempf and his team developed Explorer in conjunction with the Northeast Gas Association, the U.S. Department of Energy's National Energy Technology Laboratory and NASA. The robot is segmented like a link sausage with front- and rear-fisheye cameras and lights. It interacts with a remote operator via wireless communication while it's inside a pipe and relays near real-time images of its interior, as well as other data. Explorer can travel great distances from its point of entry into a pipeline. Its travel range is exclusively determined by its wireless communication range and battery power.

supported the first deployment of the robot in Yonkers, N.Y., where it successfully inspected hundreds of feet of eight-inch-diameter, live, cast-iron gas

"This kind of remote inspection technology

main sections originally installed in 1890. Since then, Explorer has been put through extensive tests, including weeklong runs of multiple eight-hour days in live, explosive cast-iron and steel pipelines across the northeastern U.S. The system is currently being upgraded to include nondestructive evaluation sensors along with its baseline video cameras.

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—Hagen Schempf

"This kind of remote inspection technology will change the face of infrastructure maintenance," Schempf said. "It is only the tip of the iceberg when it comes to using high-tech wireless inspection devices in areas traditionally thought to be inaccessible to human beings.

"We believe this to be the beginning of a new technology application arena for robotics and wireless communications," Schempf said. "It just happens to be inside a pipe, underground and out of sight. This kind of technology will be essential in years to come to control costs in utility operating budgets and may even expand to other applications outside gas distribution."

Schempf's teammates include NREC Research Engineer William Crowley, Electronic Technician Robert Engel, Principal Research Engineer Alan Gavaert, Commercialization Specialist Todd Graham, Mechanical Technician III Joe Martin, Senior Research Engineer Edward Mutschler and Senior Software Engineer George Skoptsov.

For more information on Explorer, see www.rec.ri.cmu.edu/projects/explorer/.

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